

**PATENT**

Atty. Dkt. No. APPM/006716/ETCH/SILICON/PJS

**IN THE CLAIMS:**

Please cancel claims 35-49 as follows:

1. (Previously Presented) A method for monitoring an etch process, comprising:
  - (a) performing pre-etch measurements of a substrate to generate pre-etch measurement information;
  - (b) applying an outlier filter to remove outliers in the pre-etch measurement information;
  - (c) providing the substrate along with the pre-etch measurement information to an etch reactor;
  - (d) etching the substrate in the etch reactor using an etch process, wherein the pre-etch measurement information in combination with etch process monitoring are used to monitor an etch process endpoint; and
  - (e) terminating the etch process based on the etch process monitoring having identified that the etch process has reached the etch process endpoint.
2. (Cancelled)
3. (Previously Presented) The method of claim 1 wherein the etch process monitoring of step (e) further comprises achieving a pre-determined etch depth for the etch process.
4. (Previously Presented) The method of claim 1 wherein the etch process monitoring of step (e) further comprises achieving pre-determined feature dimensions for structures formed during the etch process.
5. (Cancelled)
6. (Original) The method of claim 1 wherein the pre-etch measurement information is performed using optical metrology.

## PATENT

Atty. Dkt. No. APPM006716/ETCH/SILICON/PJS

7. (Original) The method of claim 6 wherein the optical metrology comprises one or more selected from the group consisting of interferometry, scatterometry, reflectometry and ellipsometry.
8. (Original) The method of claim 1 wherein the etch process monitoring is performed using optical metrology.
9. (Original) The method of claim 8 wherein the optical metrology comprises one or more techniques selected from the group consisting of interferometry, scatterometry and reflectometry.
10. (Original) The method of claim 1 wherein the etch process monitoring further comprises:
  - using a correlation between a vertical etch rate and a horizontal etch rate.
11. (Original) The method of claim 1 wherein the etch process monitoring further comprises:
  - directing radiation onto the substrate;
  - collecting a portion of the radiation reflected from the substrate; and
  - using an interferometric measuring technique to measure a thickness of a layer.
12. (Original) The method of claim 11 wherein the radiation is directed substantially perpendicular to the substrate.
13. (Original) The method of claim 11 wherein the spectrum of the radiation directed onto the substrate comprises wavelengths in a range from about 200 to 800 nm.
14. (Original) The method of claim 11 wherein an intensity of the radiation is modulated at a frequency of about 10 Hz.

## PATENT

Atty. Dkt. No. APPM006716/ETCH/SILICON/PJS

15. (Original) The method of claim 1 wherein the etch process monitoring further comprises:

directing radiation onto the substrate;

collecting a portion of the radiation reflected from the substrate; and

measuring an intensity of wavelengths in a spectrum of the radiation reflected from the substrate.

16. (Original) The method of claim 15 wherein the etch process monitoring further comprises:

using a correlation between a spectral position of a minimum in the spectrum and a width of structures formed on the substrate.

17. (Original) The method of claim 1 wherein the pre-etch measurements are provided by one of a metrology module coupled to a process system including the etch reactor and a metrology module removed from said process system.

18. (Previously Presented) A method for monitoring an endpoint of a mask trimming process, comprising:

(a) performing pre-etch measurements of a substrate having a mask thereon to generate pre-etch measurement information of such mask;

(b) applying an outlier filter to remove outliers in the pre-etch measurement information;

(c) providing the substrate along with the pre-etch measurement information to an etch reactor;

(d) trimming the mask using an etch process, wherein the pre-etch measurement information in combination with etch process monitoring are used to monitor a trim process; and

(e) terminating the trim process when the etch process monitoring indicates that the mask has been trimmed to pre-determined dimensions.

19. (Cancelled)

## PATENT

Atty. Oki. No. APPM006716/ETCH/SILICON/PJS

20. (Original) The method of claim 18 wherein the mask is a photoresist patterned mask.
21. (Original) The method of claim 18 wherein the mask is trimmed using a plasma process.
22. (Cancelled)
23. (Original) The method of claim 18 wherein the pre-etch measurement information is performed using optical metrology.
24. (Original) The method of claim 23 wherein the optical metrology comprises one or more techniques selected from the group consisting of interferometry, scatterometry, reflectometry and ellipsometry.
25. (Original) The method of claim 18 wherein the etch process monitoring is performed using optical metrology.
26. (Original) The method of claim 25 wherein the optical metrology comprises one or more techniques selected from the group consisting of interferometry, scatterometry and reflectometry.
27. (Original) The method of claim 18 wherein the etch process monitoring further comprises:  
using a correlation between a vertical etch rate and a horizontal etch rate.
28. (Original) The method of claim 18 wherein the etch process monitoring further comprises:  
directing radiation onto the substrate;  
collecting a portion of the radiation reflected from the substrate; and

## PATENT

Atty. Dkt. No. APPM/006716/ETCH/SILISON/PJS

using an interferometric measuring technique to measure a thickness of a layer.

29. (Original) The method of claim 28 wherein the radiation is directed substantially perpendicular to the substrate.

30. (Original) The method of claim 28 wherein a spectrum of the radiation directed onto the substrate comprises wavelengths in a range from about 200 to 800 nm.

31. (Original) The method of claim 28 wherein an intensity of the radiation is modulated at a frequency of about 10 Hz.

32. (Original) The method of claim 18 wherein the etch process monitoring further comprises:

directing radiation onto the substrate;

collecting a portion of the radiation reflected from the substrate; and

measuring an intensity of wavelengths in a spectrum of the radiation reflected from the substrate.

33. (Original) The method of claim 32 wherein the etch process monitoring further comprises:

using a correlation between a spectral position of a minimum in the spectrum and a width of the structures formed on the substrate.

34-49. (Cancelled)